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(54) **METAL-PLASTIC SYSTEM FOR FIXING PIECES**

(57) The invention relates to a system involving a laminated piece (8) to be assembled, preferably made of metal and having a window (9), a second piece (20) to be assembled that is provided with a dowel (10) made of plastic and an intermediate metal clip (1), which are provided with a first pair of tabs (2) having stirrups (3) on their ends which make up the elastic fixing means to a crossbar (12) of the dowel (10), a second pair of markedly diverging tabs (4) finishing in a U-shaped bend (5) oriented outward and intended for assembly by elastic deformation to the window (9) of the piece (8) and a third pair of tabs (6-7) designed for supporting on the laminated piece (8) outside the window (9), wherein an intermediate piece (21), e.g. a panel, may be optionally inserted in-between said two pieces (8) and (20). The system is particularly suitable for fixing interior paneling of automotive vehicles.

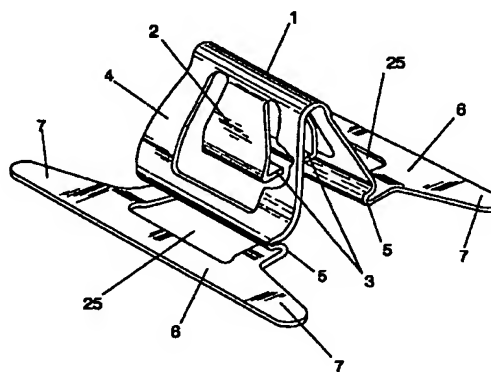


Fig. 1

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## Description

### OBJECT OF THE INVENTION

[0001] The present invention refers to a fastening system between two or more parts or elements, in which one of them, taken as a base, acts as the principal support of the system, and as such must be metallic in nature, while the element that is to be fixed must possess a plastic shaft that, inserted in a metallic staple, completes the system. In such a way that the unit is left for its insertion through simple pressure or impact carried out over a window on the metallic base cited beforehand.

[0002] The system permits the direct fastening between the two elements previously cited, or either the insertion between them of a panel or the like, of any type of material or nature.

[0003] The object of the invention is to obtain an exceedingly fast and secure assembly, with a high grade of stability and great ease for dismantling.

[0004] The system may be applied in the furniture industry, in the construction of panelled surfaces, in the manufacturing of home electrical appliances and, particularly for the coating of the interior of automobiles, as well as in any industrial sector where you require similar features.

### BACKGROUND OF THE INVENTION

[0005] Fastening systems between two or more parts are already known, systems that use a metallic staple, attachable by pressure, by elastic deformation, in a window that is operatively worked by one of said parts, that must be materialised in a sheet like body, like for example a metallic plate or a panel, being joined to the cited metallic staple a plastic shaft to which is joined, at the same time, to a second part.

[0006] Solutions of this type appear reflected in Spanish patent inventions N°9700865 and N°9700870, as well as Addition Certificates N°9702231 and N°9800689, all of which stand in the name of the present applicant.

[0007] All these registrations present as a common denominator a problem that is centred fundamentally in two aspects; on the one hand the surface for fastening is relatively small, so that the anchorage can be bettered, and on the other hand it presents dismantling problems, when it is required, which occurs habitually.

### DESCRIPTION OF THE INVENTION

[0008] The metal-plastic fastening system between parts that the invention proposes resolves in a fully satisfactory manner the problem previously cited in the two aspects stated.

[0009] For this, and parting from the basic structure of conventional fastening systems, that is, parting from

the existence of a base element, markedly plane, a metallic staple and a plastic shaft defined in the element that is to be fixed, the system of the invention uses a staple obtained by moulding and shaped by means of a metallic sheet, of iron, of a reduced thickness, duly tempered and treated with antirust protection. After the shaping of same, the staple adopts a symmetric configuration with respects to the middle axis, and more concretely through a ridge or common trestle, intermediate and rounded, there are three pairs of flexible tabs. The first pair forming a practically null angle, that is, being the tabs of same approximately parallel, each with creases or brackets that oppose each other in their free and inferior ends. The second pair of tabs forming an angle inferior to 90°, obtaining the first pair of tabs at the expense of forging the latter, the shafts of the second pair finish off, at their free end, through folds grooved into a "U" configuration, oriented outwards and of a considerable longitude. The third pair of tabs are established as a prolongation of the free edge of the intermediate tabs, beyond the respective folds, and with wide lateral expansions that configure four wings. These wings are considerably distanced, whose mission is to adhere through elasticity to all the system at the plane exterior base of the base part, and serving at the same time as a clearing element of an intermediate sheet or panel, when it is necessary.

[0010] The first pair of tabs, through their folds or brackets, are designed for the nailing of the plastic shaft participant in the other piece that is to be united, by its middle area. Meanwhile, the folds of the intermediate pair of tabs act by a side as a means of fastening to the borders of the window that is operatively worked on the sheet, and at the same time as a means of lateral fastening for the cited plastic shaft.

[0011] In accordance with this structure, the metallic staple is capable of elastically deforming to connect with the sheet, and after said connection it is capable of receiving, also following elastic deformation, the shaft that must be lodged in its interior.

[0012] In accordance with the characteristics of the invention, the plastic shaft incorporates an intermediate hollow area through which direct access is established, for example with a screwdriver or the like, to the creases or brackets of the first pair of tabs, in a way that through the rotation of said tool the cited tabs can be deformed elastically, in a separating direction, to liberate the frontal and central zone of the plastic shaft.

[0013] On the other hand, after the plastic shaft has become independent, and for the dismantling of the metallic staple, same results easily contractible by means of a pincer movement over the edges defined in the fastening folds of the sheet, through windows operatively carried out on the third set of tabs.

[0014] Finally, and in accordance with another of the characteristics of the invention, the plastic shaft is supplied with interior columns between which is defined the cited passage for the screwdriver or tool for the

opening of the first pair of tabs. These columns are assisted by exterior reinforcement consoles, that serve at the same time as centering elements in the connection of the shaft, and that may be obtained by thermoplastic injection, a simple opening mould or with movable sides.

### DESCRIPTION OF THE DRAWINGS

**[0015]** To complement the description that is being realised and with the aim of helping in a better understanding of the characteristics of the invention, in accordance with a preferential example of practical realisation of same, attached as an integral part of said description is a set of drawings, where, for purposes of illustration only and not intended as a definition of the limits of the invention, the following is shown:

Figure 1.- Shows, according to a view in perspective, the metallic staple that participates in the metal-plastic fastening system between pieces that constitute the object of the present invention.

Figure 2.- Shows an elevated view of the plastic shaft, designed to be inserted in the staple of the previous figure and that also forms part of the fastening system.

Figure 3.- Shows, finally, a lateral elevated view, and partially cut, of the whole system as a whole, in accordance with a practical realisation example in which between two parts that are to be united is situated also an intermediate part that remains fixed to the others in a parallel way.

### PREFERRED EMBODIMENT OF THE INVENTION

**[0016]** From viewing these figures we can observe how the system that the invention proposes is formed by a metallic staple, that represented in detail in Figure 1. Parting from a central and rounded ridge (1), a first pair of tabs (2) are established, that run markedly parallel and that in their inferior and free end they each present creases or brackets (3), opposing each other, that constitute the means for the fastening of the staple to the plastic shaft, as will be seen further along.

**[0017]** This first pair of tabs (2) are obtained by forging at the expense of a second pair of tabs (4), that emerging equally from the rounded ridge (1), diverge substantially forming a dihedral angle inferior to 90°, finishing off these pair of tabs (4) with a symmetric configuration for the staple, with respective folds with a "U" shape configuration and concavity oriented outwards, determinant of grooves designed for the fastening of the staple to one of the parts that is to be united, concretely to the sheet, preferably which will be of metallic nature.

**[0018]** The second pair of tabs (4) and beyond the "U" shaped folds (5), prolong themselves in another pair

of tabs (6), markedly plane, projected in contrast and supplied each of them at their free vertex with wide wings, also opposing each other, that establishes a wide support surface for the staple over the cited sheet.

**[0019]** The metallic staple in Figure 1 is fixed to the sheet (8), preferably metallic, that constitutes one of the parts that is to be joined, through a window (9) operatively worked on same and dimensionally adequate so that two opposing edges of said plate (8) lodge into the folds (5) of the staple, following the elastic deformation of the intermediate pair of tabs (4), such that the extreme wings (7) of the third pair of tabs (6) of said staple adapt to the plate (8) on a wide surface, also being wide the contact zone between the edges (9) of the cited window and the folds (5) of the staple. After the assembly of the latter over the base sheet (8), in the interior of said staple a plastic shaft (10) is also connected through pressure, to which end said shaft incorporates on each side a pair of inclined ramps (11) that frame the central beam (12), in the form of an inverted "T" with a triangular core, of a bridge with support on vertical columns (13). The ridge (1) of the staple also rests on circular heads (14) of the mentioned columns (13).

**[0020]** The support of the plastic shaft (10) around the window (9) in which the staple is inserted is realised through the contact between the surfaces (15) and (16).

**[0021]** The anchorage of the metallic staple of Figure 1 to the plastic shaft (10) is realised through the connection of the creases or brackets (3) of the tabs (2) over the inferior edges (17) of the central beam (12) in "T" form.

**[0022]** The columns (13) of the plastic shaft (10) are reinforced externally by consoles (18), which in its vertical section (19) serve as centering elements on the window (9) for the plate or sheet (8).

**[0023]** As has been previously stated, the part or element (20) to which is joined the plastic shaft (10) may be directly fixed to the plate (8) with the collaboration of the metallic staple of figure 1, or between these elements a third part (21) may be set up, for example a panel, as has been represented in Figure 3.

**[0024]** In accordance with the structure described, the assembly of the different parts that integrate the system is carried out through simple connection by pressure. Meanwhile, for the dismantling it suffices to use a screwdriver (22), or similar element, with which, by way of a 90° rotation, the brackets (3) of the staple are separated, for its liberation from the beam (12) of the plastic shaft and, subsequently with a pincer movement over the edges (24) of the windows (25) set up over the third pair of tabs (6) of the metallic staple, so that said staple may be at the same time freed from the other piece, that is from the sheet like body (8).

### Claims

1. Metal-plastic fastening system between parts, of

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the type that one of the parts acts as the main support of the system and is materialised in a sheet like body (8), preferably of a metallic nature, with a window (9) in which a metallic staple can be connected through pressure, which receives at the same time in its core a plastic shaft (10) that forms part of another of the pieces (20) that is to be joined, with or without the insertion of an intermediate piece (21), as for example a panel. It is characterised because the cited metallic staple, obtained by moulding and shaped, adopts a symmetric configuration starting at the intermediate ridge (1), setting up on each side three pairs of tabs. The first pair of tabs (2) are markedly parallel, each furnished at their free ends with creases or brackets (3), opposing each other, for the fastening to the staple of the plastic shaft (10). A second pair of tabs (4), also emerging from the intermediate ridge (1), from which are obtained through forging the first pair of tabs (2) and that configure a dihedral angle inferior to 90°, finishing off this second pair of tabs (4), at their free end, in a fold with a "U" configuration (5) of considerable longitude and concavity oriented outwards, beyond which the second pair of tabs (4) prolong themselves to the third pair of tabs (6), which are plane, projected outwards opposing each other and furnished, in correspondence with their free vertices, with wide wings or expansions (7), determinant of a wide support surface over the sheet (8).

2. Metal-plastic fastening system between parts, in accordance with claim 1<sup>a</sup>, characterised because the plastic shaft (8) configures in its central part a beam (12), in the form of an inverted "T", with a triangular core, for the elastic deformation of the first pair of tabs (2) in the connection. Tabs whose brackets (3) are joined to the inferior edges of the cited beam (12), which rests between two columns (13) that form in the plastic shaft an intermediate gap for access towards the brackets (3) of the first pair of tabs, access for a screwdriver (22) or similar tool, for the elastic deformation of said tabs in the disconnecting manoeuvre of the plastic shaft.
3. Metal-plastic fastening systems between parts, in accordance with the previous claims, characterised because when it has been foreseen that an intermediate part be fastened (21), for example like a panel, this remains situated between the part (20) associated to the plastic shaft (10) and the third pair of tabs (6) of the metallic staple.
4. Metal-plastic fastening systems between parts, in accordance with the previous claims, characterised because the third pair of tabs (6) of the metallic staple are affected by windows (25) fixed with internal edges (24), in correspondence with the "U" shaped

folds (5) that relate said tabs (6) with the intermediate tabs (4), for a pincer movement of the staple in the dismantling manoeuvre of same.

5. Metal-plastic fastening systems between parts, in accordance with the previous claims, characterised because the columns (13) of the plastic shaft are assisted by exterior consoles (18) that, apart from acting as reinforcement elements, constitute centering supports over the corresponding edges of the window (9) of the base sheet (8).

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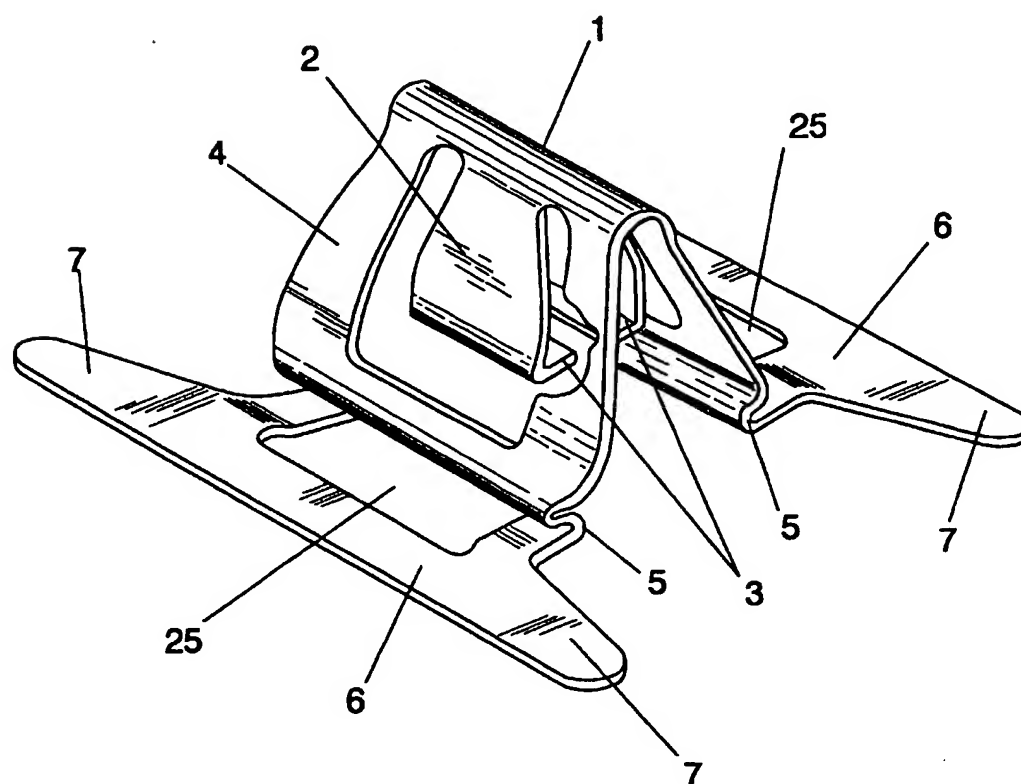


Fig. 1

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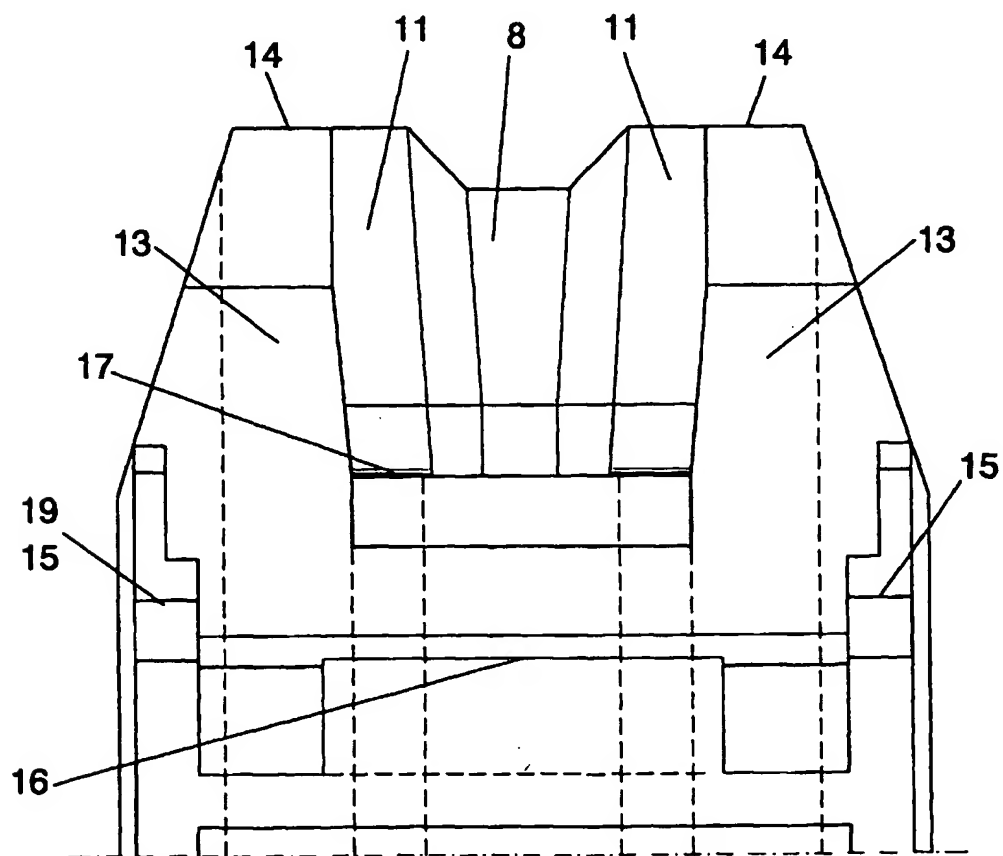
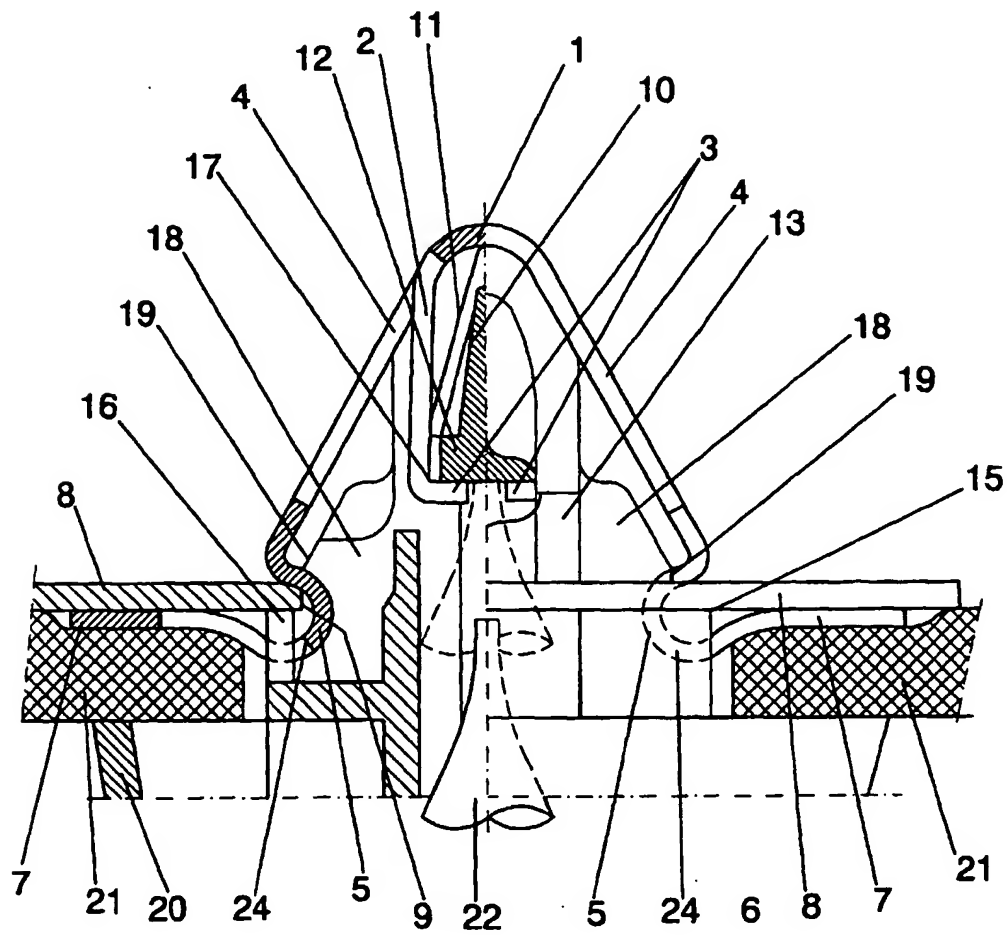


Fig. 2

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**Fig. 3**

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ES 98/00364A. CLASSIFICATION OF SUBJECT MATTER<sup>6</sup>:

IPC6: F16B 5/06, B60R 13/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: F16B5/06, 21/06, B60R 13/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC, PAJ, WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 98 48179A (IRAUSA INGENIERIA S.A.) 29 October 1998 (29.10.98) Page 18, line 11- page 21, line 13; figures 12-15	1-3,5
Y	US 5 403 034 A (GANS et al) 04 April 1995 (04.04.95) Column 2, line 50-column 3, line 59; figures 1,2	1,3,5
Y	US 5 533 237 A (HIGGINS) 09 July 1996 (09.07.96) figure 2	2
A	JP 8 334 108 A (KASAI KOGYO Co. Ltd.) 17 December 1996 (17.12.96) figures	1,2,4
A	GB 2 317 199 A (ROVER GROUP Ltd) 18 March 1998 (18.03.98) The whole document	1,5
A	GB 836 121 A (F.T. PRODUCTS Ltd.) 01 June 1960 (01.06.60)	

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Date of the actual completion of the international search  
23 April 1999 (23.04.1999)Date of mailing of the international search report  
26 April 1999 (26.04.1999)Name and mailing address of the ISA/  
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**INTERNATIONAL SEARCH REPORT**  
Information on patent family membersInternational Application No  
PCT/ES 98/00364

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 5 403 034 A	04.04.1995	EP 0 696 530 AB	14.02.1996
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